PATENT SPECIFICATION (11) 1289816

1289816

DRAWINGS ATTACHED

(21) Application No. 1851/70 (22) Filed 14 Jan. 1970

(21) Application No. 43949/70 (22) Filed 15 Sept. 1970

(23) Complete Specification filed 11 Jan. 1971

(45) Complete Specification published 20 Sept. 1972

(51) International Classification B23K 3/02

(52) Index at acceptance

H5H 1N 2E4G3 3C 3T

B3R 22E1

(54) IMPROVEMENTS IN ELECTRICALLY HEATED SOLDERING IRONS

(71) I, COLIN PETER ADAMSON, a British subject of 27, Abbotsbury Road, Hayes, Kent, do hereby declare the invention, for which I pray that a Patent may be granted to me, to be particularly described in and by the following statement:—

This invention concerns electrically heated soldering irons, and is primarily but not exclusively applicable to low-voltage irons of small size, e.g. with a soldering bit of some 1/16th part of an inch and a body diameter of some 1/8th part of an inch.

An object of this invention is to provide an electrically heated soldering iron in which the supply of electric current to a heater element thereof can be dependent upon the temperature of the soldering bit thereof.

According to this invention there is provided an electrically heated soldering iron comprising a hollow rigid body; a bit mounted about one end of the body with the tip of the bit extending beyond the one end of the body; a handle mounted on the other end of the body; at least one sleeve of heat resistant non-electrically-conductive material having an electrical heater element mounted therein, the sleeve or sleeves being positioned within the body with a space between the bit tip and the adjacent sleeve end; and an electrical temperature dependent device mounted within the space between the bit tip and the adjacent sleeve end, the electrical temperature dependent device being mounted adjacent the bit tip and spaced from said sleeve end, and the electrical temperature dependent device having leads connected thereto, which leads pass along within the body.

An advantage of such a soldering iron is that since the temperature dependent device is close to the bit tip but spaced from the heater element, the bit tip temperature has maximum effect thereon.

The sleeve or sleeves can be of a ceramic material or of aluminium oxide and the leads can pass either between the sleeve or sleeves and the body, or through bores in the sleeve or sleeves.

[*Price 25p*]

The body can engage in a blind bore in the bit.

The electrical temperature dependent device can be a thermo-couple, such as a couple of iron/eureka material, or a thermistor, and can be mounted within the body by means of a metal ferrule and/or heat conductive cement.

Two embodiments of soldering iron according to this invention will now be described by way of example with reference to the drawing, in which:—

Figure 1 is a side elevation partly in section of a first embodiment,

Figure 2 is a section on the line A—A Figure 1, and

Figure 3 is a longitudinal section through part of the second embodiment.

As shown in the drawing, each iron comprises a hollow tubular body 10 having a bit 11 mounted about one end thereof, the bit 11 comprising a sleeve part 11a and a tip 11b. In the embodiment of Figures 1 and 2, a sleeve 12 is positioned within the body 10, the sleeve 12 being of a ceramic or like heat resistant non-electrically conductive material such as aluminium oxide. The sleeve 12 has four longitudinal bores 12a, 12a, 12b, 12b therein, the bore 12a containing an electrical heater element 13, the leads from which are suitably insulated and pass-out at the rear end of the body 10.

A single sleeve or two or more independent sleeves can be used for the heater element 13, and the sleeve or sleeves can be wedged in the body 10 by means of a metal strip insert or inserts which can serve as a heat shunt. There is a space S between the bit tip 11b and the adjacent end of the sleeve 12, in which space, and adjacent to the bit tip 11b, is an electrical temperature dependent device comprising a thermocouple 14, secured by heat conductive cement 15, within an iron, steel or like metal ferrule 16. The thermocouple 14 is spaced from the adjacent end of the sleeve 12. Leads 14a connected to the thermocouple 14 pass through the bores 12b, 12b, in the sleeve 12.

A handle 17 is mounted on the rear end of the body 10, the body 10 being secured within a bush 18 positioned within the handle 17. The leads from the heater element 13 and the leads 14a from the thermocouple 14 are taken to connecting pins P and thus to appropriate conductors in a flexible cable C.

In the embodiment shown in Figure 3, the electrical temperature dependent device is a thermistor 19, which is embedded in heat conductive cement 20, and the leads 14a connected to the thermistor 19 pass between the sleeve 12 and the body 10.

A separate control unit can be used to which a plurality of similar soldering irons can be connected. The output of the electrical temperature dependent device can be amplified and used to control the heater element by means of a simple switch or a relay or preferably by a thyristor or by transistor or like solid state circuitry which will give a stepless variation in the effective power supplied to the heater element in dependence upon the temperature of the bit tip.

WHAT I CLAIM IS:—

1. An electrically heated soldering iron comprising a hollow rigid body; a bit mounted about one end of the body with the tip of the bit extending beyond the one end of the body; a handle mounted on the other end of the body; at least one sleeve of heat resistant non-electrically-conductive material having an electrical heater element mounted therein, the sleeve or sleeves being positioned within the body with a space between the bit tip and the adjacent sleeve end; and an electrical temperature dependent device mounted within the space between the bit tip and the adjacent sleeve end, the electrical temperature dependent device being mounted adjacent the bit tip and spaced from said sleeve end, and the electrical temperature dependent device having leads connected thereto, which leads pass along within the body.

2. A soldering iron as claimed in Claim 1, in which the leads pass between the sleeve or sleeves and the body.

3. A soldering iron as claimed in Claim 1, in which the leads pass through bores in the sleeve or sleeves.

4. A soldering iron as claimed in any preceding claim, in which said device is a thermocouple.

5. A soldering iron as claimed in any one of Claims 1 to 3, in which said device is a thermistor.

6. A soldering iron as claimed in any preceding claim, in which said device is mounted within the body by means of heat conductive cement.

7. A soldering iron as claimed in any preceding claim, in which said device is mounted within the body by means of a metal ferrule within which said device is mounted by means of heat conductive cement.

8. A soldering iron as claimed in any preceding claim, in which the body engages in a blind bore in the bit.

9. An electrically heated soldering iron substantially as hereinbefore described with reference to and as illustrated by Figures 1 and 2, or Figure 3 of the drawings.

KINGS PATENT AGENCY LIMITED.
By B. T. King, A.I.Mech.E. Director.
Registered Patent Agent.
146a Queen Victoria Street, London, E.C.4.
Agents for the Applicant.

Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1972.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

1289816 COMPLETE SPECIFICATION
1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

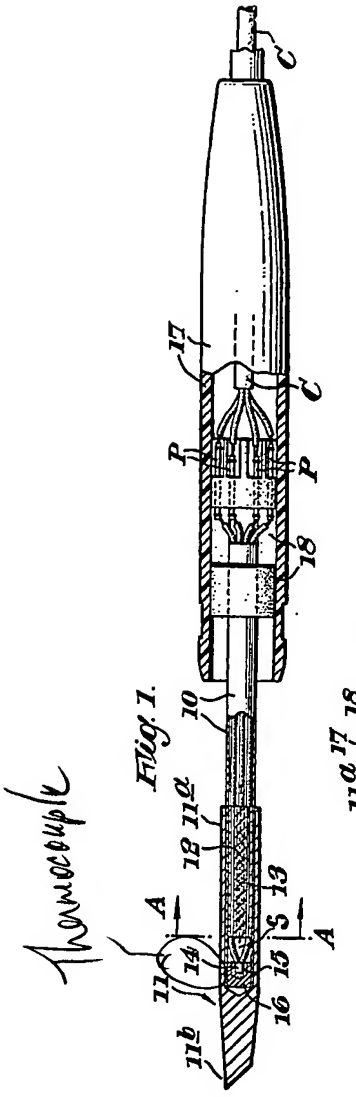

Fig. 1.

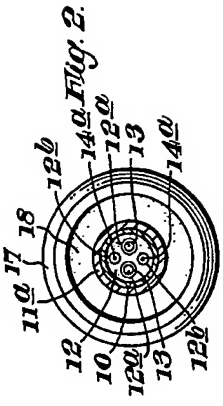

Fig. 2.

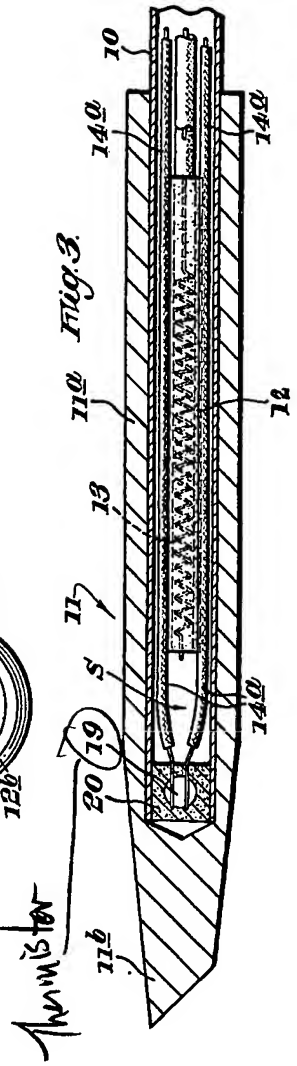

Fig. 3.